ALTERNATOR & REGULATOR - BOSCH
Article Text

1991 Volkswagen Passat
For Volkswagen Technical Site

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ARTICLE BEGINNING

1989-92 ELECTRICAL
Alternators & Regulators - Bosch

Cabriolet, Fox, Golf, GTI, Jetta, Jetta GLI, Vanagon
1991 Corrado, Passat & Golf GL

NOTE: Some Golf, GTI, Jetta and Jetta GLI models may use a Motorola alternator. Please refer to ALTERNATORS - SEV MOTOROLA article. Vanagon models only use Bosch 90-amp alternators.

DESCRIPTION

Bosch alternators are conventional 3-phase, self-rectifying type alternators. Bosch 65 through 75-amp alternators use 3 positive and 3 negative diodes connected to stator windings to rectify current. Bosch 90-amp alternators use 14 diodes.

All alternators use 3 exciter diodes connected to stator windings. These diodes turn off the alternator indicator light and supply power to the voltage regulator while the engine is running. Bosch regulators are transistorized and integral with alternator.

BELT TENSION ADJUSTMENT

BELT TENSION SPECIFICATIONS

Application	(1) Deflection In. (mm)
New Belt	5/64 (2)
Used Belt	13/64 (5)

(1) - Deflection is with 22 lbs. (10 kg) pressure applied midway on longest belt run.

TESTING (ON-VEHICLE)

WIRING CONTINUITY TEST

1) Connect a voltmeter between alternator "B+" terminal and ground. Voltmeter should indicate battery voltage. If not, check wiring between alternator and battery.

2) Turn ignition on and ensure alternator indicator light comes on. If light does not come on, check wiring between alternator and warning light, including indicator bulb.

OUTPUT TEST

1) Ensure connections at battery, alternator, and starter

(most vehicles) are clean and tight. Ensure alternator, engine and body are properly grounded. Ensure alternator drive belt is tight and in good condition.

2) Connect ammeter following manufacturer's instructions. Connect voltmeter leads to battery terminals. Adjust carbon pile on tester until voltmeter reads 13.5 volts. Alternator output should be 28-35 amps.

3) Repeat process at 1000 RPM. Alternator output should be 75-85 amps. Repeat test at 2000 RPM. Alternator output should be 89 amps. If alternator output is low, remove alternator for testing and repairs.

4) Start engine and run at 3000 RPM. Adjust carbon pile on tester to obtain maximum alternator output. Do not allow voltage to go below 12.6 volts.

5) Alternator output should equal alternator rated output, minus 16-20 amps. If reading is 16-20 amps below alternator rating, replace regulator and retest. If output is still low, repair or replace alternator.

REGULATOR CONTROL VOLTAGE TEST

1) Connect ammeter following manufacturer's instructions. Connect voltmeter leads to battery terminals. Start engine and run at 3000 RPM.

2) Run engine until voltage stops rising. Voltage should be 13.5-14.5 volts. If reading is incorrect, remove regulator and ensure brushes are longer than 7/32" (6 mm). Replace if necessary.

3) If brushes are okay and regulator fails to keep voltage within specified limits, replace regulator and retest. If voltage is still incorrect, repair or replace alternator.

BENCH TESTING

DIODE ASSEMBLY

1) Place ohmmeter on x 100 scale. Connect ohmmeter leads across "B+" terminal and 3 stator terminals one at a time. Reverse leads. Ohmmeter should indicate continuity in one direction only.

2) Connect ohmmeter leads across negative plate and 3 stator terminals one at a time. See Fig. 1. Reverse leads. Ohmmeter should indicate continuity in one direction only.

3) Connect ohmmeter leads across "D+" terminal and 3 stator terminals one at a time. Reverse leads. Ohmmeter should indicate continuity in one direction only. Replace diode assembly if defective.

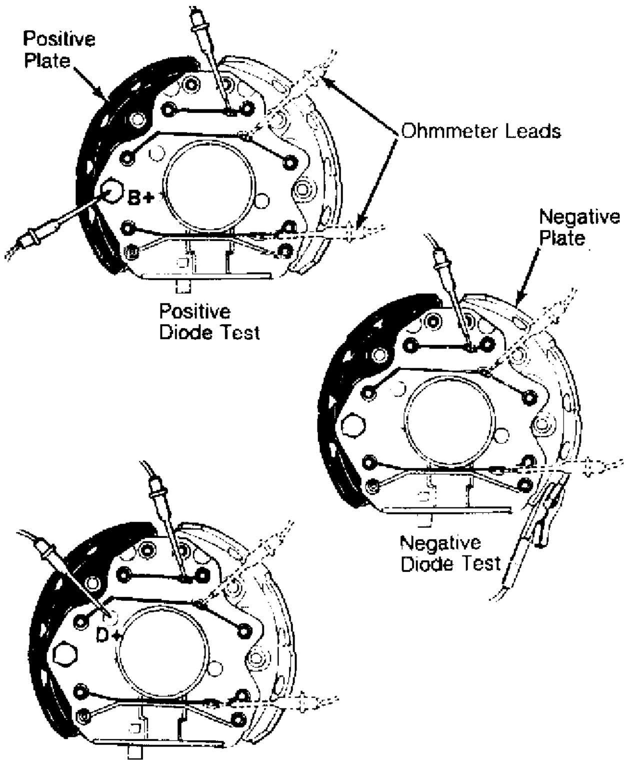


Fig. 1: Bosch Diode Assembly Test
Courtesy of Volkswagen United States, Inc.

STATOR

1) Place ohmmeter on lowest scale. Connect ohmmeter across stator leads. Resistance between leads should be approximately .14-.15 ohms for 55-amp alternator and .09-.10 ohms for 65 through 90-amp alternators. If resistance is incorrect, stator has open or shorted windings and must be replaced.

2) Place ohmmeter on X 1000 scale. Connect ohmmeter between stator core and stator lead. No continuity should exist. If continuity exists, stator is grounded and must be replaced.

ROTOR

1) Place ohmmeter on lowest scale. Connect ohmmeter across slip rings. Resistance should be 2.8-3.1 ohms for 65 through 90-amp alternators.

2) If resistance is too low, rotor has short circuit and must be replaced. If resistance is infinity (no continuity), rotor has open circuit and must be replaced.

3) Place ohmmeter on x 1000 scale. Connect ohmmeter between either slip ring and rotor core. No continuity should exist. If continuity exists, rotor is grounded and must be replaced.

4) Clean slip rings using fine sandpaper. Rings which are worn or pitted should be turned on lathe. Minimum ring diameter is 1

1/16".

5) If slip rings are beyond repair, remove rear bearing from slip ring end of rotor. Unsolder wires from slip rings and bend up ends of rotor winding. Pull off slip rings. Ensure ends of rotor winding are not damaged.

6) Insert ends of rotor winding into slip ring and press new slip ring onto rotor. Slip ring end must be 9/64" from end of collar. Solder rotor winding to slip ring terminals. Turn rings on lathe and retest rotor. Maximum slip ring run-out is .0012" (.03 mm).

BEARINGS

Always replace bearings. If replacement front bearing is sealed on one side only, open side must face rotor. If replacement rear bearing is sealed on one side only, open side must face away from rotor.

BRUSHES

Ensure brushes are longer than 7/32". Replace if necessary. Unsolder brushes from voltage regulator. Solder new brushes. Do not allow solder to run into strands of brush leads. Brushes must be free to slide in brush holder with normal spring tension of 10-14 ozs. (283-397 g).

OVERHAUL

For alternator disassembly and reassembly, refer to Fig. 2.

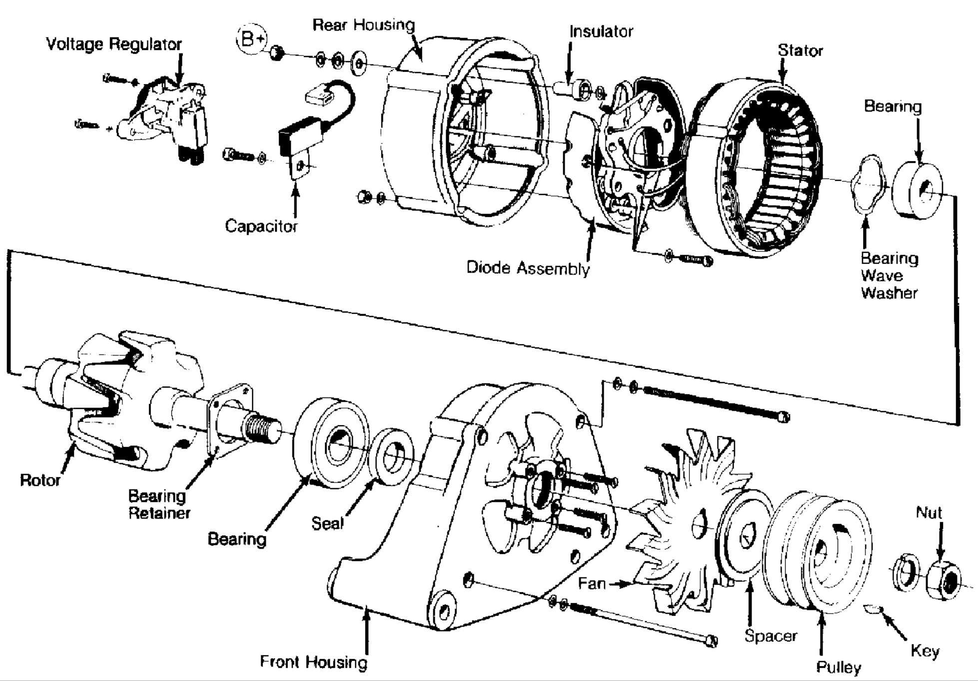


Fig. 2: Exploded View of Typical Bosch Alternator
Courtesy of Volkswagen United States, Inc.

END OF ARTICLE